

IN THE CLAIMS:

1. (previously presented) An IED comprising:  
a base module, said base module including:  
a power monitoring circuit operative to monitor a parameter of a portion of a power distribution system and generate an analog signal representative thereof;  
a processor coupled with said power monitoring circuit, said processor comprising an analog to digital converter operative to convert said analog signal to a digital signal representative thereof, said processor operative to implement first power management functionality and generate first power management data;  
at least one of a display and a communications interface coupled with said processor and operative to communicate said first power management data external to said IED;  
a first interface coupled with said processor and said at least one of a display and a communications interface, said first interface operative to receive a first external function module, said first external function module comprising second power management functionality, wherein said first interface is further operative to facilitate implementation of said second power management functionality.
2. (original) The IED of Claim 1, wherein said first power management functionality comprises a first plurality of power management functions, said first interface being further operative to facilitate said second power management functionality to disable a first subset of said first plurality of power management functions.
3. (original) The IED of Claim 2, wherein said second power management functionality comprises a second plurality of power management functions, said first interface operative to facilitate substitution of said second subset for said first subset.
4. (original) The IED of Claim 1, wherein said first power management functionality comprises a plurality of power management functions, said first interface being further operative to facilitate said second power management functionality to utilize a subset of said plurality of power management functions.

5. (original) The IED of Claim 4, wherein said subset of said plurality of power management functions comprises a set of register outputs stored in a memory.
6. (original) The IED of Claim 5, wherein utilization of said set by said second power management functionality is not dependent upon a storage location of said set in said memory.
7. (original) The IED of Claim 1, wherein said first power management functionality comprises a plurality of power management functions, said first interface being further operative to facilitate said second power management functionality to supplement a subset of said plurality of power management functions.
8. (original) The IED of Claim 7, wherein said subset of said plurality of power management functions comprises a set of register outputs stored in a memory, said second power management functionality operative to add additional register outputs to said set.
9. (previously presented) The IED of Claim 1, wherein said at least one of a display and a communications interface is capable of being utilized by said first external function module to communicate second power management data generated by said first external function module.
10. (original) The IED of Claim 9, wherein said second power management functionality implements a first communications protocol for use on said communication interface different from a second communications protocol implemented by said first power management functionality.
11. (original) The IED of Claim 9, wherein said second power management data comprises parameter and setup information for said first external function module.

12. (original) The IED of Claim 9, wherein said second power management data comprises results of computation performed by said first external function module based on said digital signal.
13. (original) The IED of Claim 1, wherein said communications interface comprises an RS-485 serial port.
14. (original) The IED of Claim 1, wherein said communications interface comprises an infrared port.
15. (original) The IED of Claim 1, wherein said communications interface comprises a network port.
16. (original) The IED of Claim 15, wherein said network comprises Ethernet.
17. (original) The IED of Claim 1, wherein said communications interface comprises an external device control port.
18. (original) The IED of Claim 1, wherein said interface communicates said digital signal to said first external function module.
19. (original) The IED of Claim 18, wherein said digital signal is communicated to said first external function module continuously in real time.
20. (original) The IED of Claim 18, wherein said second power management functionality comprises computing kilowatts based on said digital signal.
21. (original) The IED of Claim 18, wherein said second power management functionality comprises computing harmonics based on said digital signal.

22. (original) The IED of Claim 18, wherein said second power management functionality comprises recording a waveform of said digital signal.
23. (original) The IED of Claim 18, wherein said second power management functionality comprises computing symmetrical components based on said digital signal.
24. (previously presented) The IED of Claim 18, wherein said second power management functionality comprises recording data from said first power management functionality.
25. (original) The IED of Claim 1, wherein said first interface is capable of receiving said first external function module without uninstalling said IED.
26. (original) The IED of Claim 1, wherein said first interface is further operative to receive a plurality of said first external function modules, each of said plurality of first external function modules comprising a second interface, wherein a first of said plurality of first external function modules is coupled with said first interface and subsequent of said plurality of first external function modules are sequentially coupled with each other via said second interface and wherein said first interface communicates with each of said plurality of first external function modules as though each was connected with said first interface.
27. (original) The IED of Claim 1, wherein said first interface is further operative to communicate with a second external function module coupled with said first external function module through said first external function module.
28. (original) The IED of Claim 27, wherein a first connection of said second external function module to said first external function module and a second connection of said first external function module to said interface uniquely identifies each of said

first and second external function modules for subsequent individual communications by said interface based on said first and second connections.

29. (original) The IED of Claim 1, wherein said base module further comprises a first non-volatile memory operative to store first program code for execution by said processor, said processor being operative to access a second non-volatile memory in said first external function module via said first interface, said second non-volatile memory comprising second program code, said processor further operative to replace said first program code in said first non-volatile memory with said second program code.
30. (original) The IED of Claim 29, wherein said processor is further operative to check said second program code for compatibility with said base module prior to replacing said first program code.
31. (original) The IED of Claim 29, wherein said processor is further operative to check a version identifier of said second program code and only replace said first program code if said version identifier identifies said second program code as a later version than said first program code.
32. (original) The IED of Claim 29, wherein said processor is further operative to select said second program code from a plurality of program code stored in said second non-volatile memory based on compatibility with said base module.
33. (original) The IED of Claim 29, wherein said processor is further operative to select a correct version of said second program code from a plurality of program code stored in said second non-volatile memory, each of said plurality of program code characterized by a different version.
34. (original) The IED of Claim 29, wherein said first non-volatile memory comprises a flash memory.

35. (original) The IED of Claim 29, wherein said second non-volatile memory comprises a flash memory.

36-57. (cancelled)

58. (withdrawn) An IED comprising:

a power monitoring circuit operative to monitor a parameter of a portion of a power distribution system and generate an analog signal representative thereof;

an analog to digital converter coupled with said power monitoring circuit, said analog to digital converter operative to convert said analog signal to a digital signal representative thereof;

a processor coupled with said analog to digital converter and operative to implement power management functionality and generate power management data;

at least one of a display and a communications interface coupled with said processor and operative to communicate said power management data external to said IED;

an interface coupled with said processor and operative to receive a power supply; and

wherein said power supply supplies power to the IED and said power supply can be removed without uninstalling said IED.

59. (withdrawn) The power meter of claim 58 wherein uninstalling includes removing the voltage input connections from said IED.

60. (withdrawn) The power meter of claim 58 wherein uninstalling includes removing the current input connections from said IED.

61. (withdrawn) The power meter of claim 58 wherein uninstalling includes removing said IED from a panel.

62. (withdrawn) The power meter of claim 61 wherein said panel is a switchgear panel.

63-68. (cancelled)

69. (previously presented) A method of expanding functionality of an IED, said IED comprising a base module coupled with a portion of a power distribution system, said method comprising:
- (a) monitoring a parameter of said portion;
  - (b) generating an analog signal representative of said parameter;
  - (c) converting said analog signal to a digital signal representative thereof;
  - (d) implementing first power management functionality on said digital signal;
  - (e) generating first power management data by said first power management functionality;
  - (f) communicating said first power management data externally of said IED via at least one of a display and a communications interface;
  - (g) receiving a first external function module by said base module, said first external function module comprising second power management functionality; and
  - (h) facilitating implementation of said second power management functionality.
70. (previously presented) The method of Claim 69, wherein said first power management functionality comprises a first plurality of power management functions, said method further comprising:
- (i) facilitating said second power management functionality to disable a first subset of said first plurality of power management functions.
71. (previously presented) The method of Claim 70, wherein said second power management functionality comprises a second plurality of power management functions, said method further comprising:
- (j) facilitating substitution of said second subset for said first subset.
72. (previously presented) The method of Claim 69, wherein said first power management functionality comprises a first set of register outputs stored in a memory, said method further comprising:

- (i) facilitating said second power management functionality to utilize a subset of said first set of register outputs independent of said register ~~outputs~~ outputs' location in said memory.
73. (previously presented) The method of Claim 69, further comprising:
- (i) communicating said digital signal to said first external function module.
74. (previously presented) The method of Claim 73, wherein (i) further comprises communicating said digital signal in real time.
75. (previously presented) The method of Claim 73, further comprising:
- (j) computing a kilowatt value by said second power management functionality based on said digital signal.
76. (previously presented) The method of Claim 73, further comprising:
- (j) computing at least one harmonic by said second power management functionality based on said digital signal.
77. (previously presented) The method of Claim 73, further comprising:
- (j) recording a waveform by said second power management functionality based on said digital signal.
78. (previously presented) The method of Claim 73, further comprising:
- (j) computing at least one symmetrical component by said second power management functionality based on said digital signal.
79. (previously presented) The method of Claim 69, further comprising:
- (i) receiving, by said base module, said first external function module without uninstalling said IED.
80. (previously presented) The method of Claim 69, further comprising:



- (i) communicating with a second external function module coupled with said first external function module through said first external function module.
81. (previously presented) The method of Claim 80, further comprising:
- (j) identifying each of said first and second external function modules for subsequent individual communications with said base module based on a first connection of said second external function module to said first external function module and a second connection of said first external function module to said base module.
82. (previously presented) The method of Claim 69, further comprising:
- (i) storing first program code in a first non-volatile memory in said base module;
  - (j) accessing a second non-volatile memory in said first external function module, said second non-volatile memory comprising second program code; and
  - (k) replacing said first program code in said first non-volatile memory with said second program code.
83. (previously presented) The method of Claim 82, further comprising:
- (l) checking a version identifier of said second program code; and
- wherein (k) further comprises replacing said first program code if said version identifier identifies said second program code as a later version than said first program code.
84. (previously presented) The method of Claim 82, further comprising:
- (l) selecting said second program code from a plurality of program code stored in said second non-volatile memory based on compatibility with said base module.
85. (previously presented) The method of Claim 82, further comprising:
- (l) selecting a correct version of said second program code from a plurality of program code stored in said second non-volatile memory, each of said plurality of program code characterized by a different version.

86. (previously presented) The IED of claim 19, wherein said digital signal comprises samples representative of at least one of voltage and current in said power distribution system.
87. (previously presented) The method of claim 74, wherein (i) further comprises communicating samples representative of at least one of voltage and current continuously in real time.
88. (previously presented) The IED of claim 27, wherein said first external function module and said second external function module are operative to be physically coupled together.
89. (previously presented) The IED of claim 1, wherein said base module comprises a first enclosure and said first external functional module comprises a second enclosure outside said first enclosure; said first interface comprising a coupling between said base module and said external function module.
90. (previously presented) The IED of claim 1, wherein said power monitoring circuit further comprises current inputs and voltage inputs.
91. (previously presented) The IED of Claim 89, wherein said first power management functionality comprises computing an rms voltage of said power distribution system using said digital signal.
92. (previously presented) The IED of claim 91, wherein said second power management functionality comprises recording a waveform of said digital signal in a memory within said first external function module.

93. (previously presented) The IED of Claim 90, wherein said first power management functionality comprises computing an rms voltage of said power distribution system using said digital signal.
94. (previously presented) The IED of claim 93, wherein said second power management functionality comprises recording a waveform of said digital signal in a memory within said first external function module.
95. (previously presented) The IED of Claim 30, wherein said processor is further operative to check a version identifier of said second program code and only replace said first program code if said version identifier identifies said second program code as a later version than said first program code.
96. (previously presented) The IED of Claim 1, wherein said first power management functionality comprises computing an rms voltage of said power distribution system using said digital signal.
97. (previously presented) The IED of claim 96, wherein said second power management functionality comprises recording a waveform of said digital signal in a memory within said first external function module.
98. (previously presented) The IED of claim 96, wherein said second power management functionality comprises communicating a signal indicative of said rms voltage over a second communications interface.
99. (previously presented) The IED of claim 98, wherein said second communications interface comprises Ethernet.
100. (previously presented) The IED of claim 96, wherein said second power management functionality comprises at least one of an analog input, and an analog output.

101. (previously presented) The IED of claim 96, wherein said second power management functionality comprises a data logging feature.
102. (previously presented) The IED of claim 96, wherein said first power management functionality further comprises computing watts flowing within said power distribution system using said digital signal.